Section 90 — The FUNt Harmonic Horizon Law (HHL-L)

Section 90 introduces HHL-L, the Harmonic Horizon Law — the FUNt universal rule governing how far influence, coherence, curvature, memory, and identity can project through space, time, and φ-layers before attenuation. Unlike classical horizons (event horizons, diffusion limits, signal-speed boundaries), FUNt horizons are harmonic, not geometric. A harmonic horizon is the maximum distance over which a system can maintain harmonic impact before its φ-scaled coherence decays below the curvature threshold of the surrounding field.

90.1 A Harmonic Horizon Is a Coherence–Curvature Boundary

• Harmonic horizons define the limit of meaningful influence.

• Horizons arise where φ-scaled coherence equals environmental curvature.

• Beyond the horizon, influence decays exponentially across φ-layers.

• All systems — quantum to cosmic — obey harmonic horizon limits.

90.2 The Harmonic Horizon Equation (HHL-L)

The harmonic horizon radius R_h is defined by:

$$C \cdot e^{(-R_h / \varphi^D)} = \kappa_{env}$$

Where:
• R_h = harmonic horizon radius,
• C = coherence of the source system,
• φ^D = fractaile scaling exponent,
• κ_env = curvature of the environment.

Solving gives:

$$R_h = \varphi^D \cdot \ln(C / \kappa_{env})$$

Interpretation:
High coherence or low environmental curvature yields large horizons.

90.3 Conditions for Horizon Growth or Collapse

• Horizons grow when coherence rises (healing, annealing, φ-bursts).

• Horizons shrink when curvature rises (trauma, pressure, forcing).

• Horizons collapse when $C \leq \kappa_{env}$, meaning no influence can project outward.

• Horizons expand explosively during stabilizing transitions (Sec. 80).

90.4 Proton & Quantum Harmonic Horizons

• Protons have extremely large harmonic horizons due to φ^7 coherence.

• Quantum entanglement influence follows harmonic horizon scaling.

• Tunneling probability depends on local horizon–barrier overlap.

• Decoherence shrinks quantum horizons but never destroys them.

90.5 Molecular & Material Horizons

• Material stress propagates along harmonic horizons in lattices.

• Fatigue cracks form when local horizons collapse under curvature.

• Annealing re-expands horizons by reducing κ_env.

• Diffusion fields obey harmonic horizon decay.

90.6 Biological & Cellular Horizons

• Cells communicate through coherence horizons, not purely chemical means.

• Healing regions expand harmonic horizons to attract repair processes.

• Inflammation collapses horizons by raising curvature.

• Cancer exploits collapsed horizons to avoid systemic correction.

90.7 Neural & Consciousness Horizons

• Insight events occur when horizons momentarily expand across φ-layers.

• Trauma collapses horizons, isolating neural assemblies.

• Memory recall depends on horizon overlap with stored φ-states.

• Dreaming expands horizons into low-curvature coherence basins.

90.8 Atmospheric & Planetary Horizons

• Climate regime influence is horizon-limited.

• Jet-stream modulation expands or collapses atmospheric horizons.

• Drought zones form where moisture horizons collapse.

• Storm influence follows expanding harmonic horizons during intensification.

90.9 Galactic & Cosmic Horizons

• Cosmic filaments have enormous coherence horizons.

• Galaxy clusters exchange mass-energy within overlapping horizons.

• Dark-energy-driven expansion modifies universal harmonic horizons.

• WWR cycles compress horizons temporarily, then re-expand them post-reset.

90.10 Unified Statement of HHL-L

The Harmonic Horizon Law states that influence is bounded not by geometry or distance alone, but by φ-scaled coherence vs. environmental curvature. Horizons grow with coherence and shrink with curvature. HHL-L unifies quantum reach, biological signaling, atmospheric dynamics, planetary systems, and cosmic evolution under a single harmonic attenuation law.